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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,417	11/14/2003	Shivakumar Sitaraman	24-NS-120423-6	2288

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John S. Beulick
Armstrong Teasdale LLP
Suite 2600
One Metropolitan Square
St. Louis, MO 63102

EXAMINER	
PALABRICA, RICARDO J	

ART UNIT	PAPER NUMBER
3663	

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/714,417	SITARAMAN ET AL.	
	Examiner	Art Unit	
	Rick Palabrica	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) *2,8,9,11,16,17 and 20-29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-7, 10, 12-15, 18 and 19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 8/31/06, which directly amended claims 1 and 12, and traversed the rejection of claims in the 3/2/06 Office action, has been entered.

Response to Arguments

2. Applicant's arguments filed in said 8/31/06 submission have been fully considered but they are not persuasive.

Applicant argues that the claimed method: a) "is an estimating tool and not for calculating the exact helium content of the shroud"; and b) "provide[s] a nuclear engineer with information as to whether there might be concerns of increasing helium content in the shroud." The examiner disagrees.

Applicant himself admits that knowledge of the helium content in the shroud is significant information for plant operation and maintenance, as evidenced by the following statement in the specification:

> *"Knowledge of helium production in stainless steel material subjected to neutron fields is important in determining if the irradiated components can be re-welded. Helium deposition in the shroud is important because of the need to perform welding on the shroud during maintenance and repair procedures. As the helium*

content of a stainless steel component, for example, the shroud, increases, the weldability of the stainless steel component decreases." See paragraph 0006.

Applicant clearly indicates that the intended utility of the helium content information is for maintenance and repair of the shroud of a nuclear reactor, which includes welding work. This shroud is radioactive because of neutron irradiation, and maintenance personnel who perform work on this structure are inherently exposed to radiation at levels that are not insignificant. The length of time that maintenance personnel would spend repairing a shroud, and the corresponding accumulated radiation exposure they would receive, increases with reduced weldability of this shroud. Thus, while an exact value of the helium content in the shroud is not required, any estimate of this helium content must still be reasonably accurate to be of value to for the utility stated by the applicant. Such reasonably accurate estimate is important for the proper and efficient planning of the repair work by a maintenance planner needs such information, for example, to determine how many repair personnel to use, how long each person would be allowed to work on the shroud, what type of protective measures to use (e.g., temporary shielding), what type of training repair personnel should undergo, whether mock-ups of the repair job is required, etc. Thus, while the applicant argues that his method is only a so-called "estimating tool", it must nonetheless provide reasonable accuracy to be useful.

As to the nuclear engineer, for him to conclude that there might be concerns of increasing helium content in the shroud, on the basis of applying applicant's equation, he must know if his specific situation is the same as, or falls within reasonable bounds of, conditions under which applicant has derived his correlation. Only then will he have

reasonable confidence that his conclusion has a firm basis. Without this information, the nuclear engineer's conclusion would not have a defensible basis.

Applicant has failed to provide an adequate description or enabling disclosure that would allow a maintenance planner or a nuclear engineer to determine whether the applicant's claimed method are appropriate to their specific situations, as further explained below.

As stated in the 3/2/06 Office action, applicant's method is based on an empirical equation that correlates helium content in the shroud (C_{He}) with neutron fluence (Φ_j), e.g., see claim 1. This correlation includes correlation coefficients, i.e., numerical constant, "1031" and parameter, "b_j". According to the specification:

- *"determining 72 neutron fluences for predetermined areas of reactor 10 can be accomplished by measuring 76 neutron fluxes at the predetermined areas of reactor 10.." Underlining provided. See paragraph 0024.*
- *"A set of tests was performed on stainless steel samples taken at locations near the shroud and at a midway location between the shroud and at a midway location between the shroud and the pressure vessel in a boiling water reactor." Underlining provided. See paragraph 0027.*
- *"The initial boron content in the samples was also determined using a subsequent irradiation in a known neutron field." Underlining provided. See paragraph 0027.*
- *"A correlation was developed to calculate the production of helium at shroud 20 when the neutron field is known." See paragraph 0026.*

Clearly, the correlation coefficients in applicant's equation have been obtained are based on a plurality of factors and conditions specific to applicant's case, e.g., number of test samples and their locations, type of the boiling water reactor and its properties, including power level, neutron flux distribution across and along the core,

and years of reactor operation, type of stainless steel for the shroud, including its boron content, etc.

For example, a correlation based on a relatively small number of samples will yield a different set of values of the correlation coefficients compared to a large number of samples, with the latter providing better representation of the neutron fluence and therefore more accurate estimate of the helium content.

Correlation based on a different boiling water reactor design than applicant's case, e.g., different fuel enrichments, different core configuration, different power, different operating history) will yield a different set of values of correlation coefficients.

Correlation based on a shrouds made of stainless steel with a boron impurity different from applicant's case will also give rise to different values of correlation coefficients.

As stated in the 3/2/06 Office action, applicant has failed to provide information, among others, on the above factors and conditions. Thus, an artisan would have no recourse but to resort to trail-and-error to validate his helium content results based on the claimed equation. Such validation cannot be avoided because an artisan would have no other basis to determine whether the coefficients have to be modified to fit his own conditions, e.g., different fuel enrichment, different core design, etc. Such validation would also have to be done, e.g., by a maintenance planner or a nuclear engineer in order to have confidence of the reasonableness of helium content estimates based on applicant's method.

3. Applicant also argues that the claimed methods are straight forward in that the neutron fluence is determined by calculation using simulation incorporating a Monte Carlo radiation transport methodology that "utilizes computer programs and nuclear data libraries that are known and available from the Department of Energy." The examiner disagrees.

Regardless of the manner of obtaining the neutron fluence, i.e., either by computer calculated or actual measurement, the value of the helium content in the shroud still has to be calculated using the correlation by on applicant's specific conditions. Thus, applicant's argument on the fluence calculation being straightforward is not dispositive of the issues raised by the examiner in section 2 above.

4. As to applicant's objection to the citation of Scarborough, this case has been cited by the examiner in the context of providing an example of where an overall lack of enablement, as in applicant's case, required an artisan has to perform undue experimentation to practice a claimed invention. The example was not intended to equate applicant's process to the apparatus in the cited case.

5. As to applicant's objection to Ganesan and Goel, these references were cited to further confirm what the applicant himself admits that helium formation has a pronounced effect on the properties of stainless steel. There is nothing to rebut about the two references. What these references convey is that it is important to have a good estimated of the helium content in the shroud.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:
The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 3-7, 10, 12-15, 18 and 19 are rejected under 35 U.S.C. 112, first paragraph. The reasons are the same as those given in section 3 of the 3/2/06 Office action, as further clarified in sections 2-5 above, which reasons are herein incorporated.

7. Claims 1, 3-7, 10, 12-15, 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The reasons are the same as those given in section 4 of the 3/2/06 Office action, as further clarified in sections 2-5 above, which reasons are herein incorporated.

Conclusion

8. This is a continuation of applicant's earlier application of the same number. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds of record in the next Office action if they had been entered earlier. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first

action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 571-272-6880. The examiner can normally be reached on 6:00-4:30, Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RJP
October 24, 2006

RICARDO J. PALABRICA
PRIMARY EXAMINER